

In the Drawings:

Formal drawings for Figures 1 through 4 are attached to this response.

Attachments: Replacement sheets 1 to 4

REMARKS

Reconsideration is respectfully requested in view of the foregoing amendments and the following remarks.

Formal drawings are enclosed to replace the informal drawings filed with the application.

Claims 6-10 have been cancelled. Claims 1-5 are pending.

Claim 4 has been amended to recite "reducing said pressure ratio by opening a vane of said compressor and reducing an EGR flow if said standard mass flow rate is lower than said surge mass flow rate." No new matter has been added.

Claim 1 was rejected under 35 USC § 103(a) as unpatentable over the abstract of Japanese Patent Publication No. 03-100398 by Iida in view of US Patent Application Publication No. 2002/0139361 by Itoyama, et al.

The Iida abstract discloses a method for preventing surging in a turbo-compressor including the steps of calculating a compression ratio of the compressor inlet pressure and outlet pressure; calculating a correction flow W_c from detected compressor outlet air flow, compressor intake air temperature, and compressor intake air pressure; calculating a surging limit compression ratio from the correction flow W_c ; and comparing the compression ratio to the surging limit compression ratio. If the compression ratio is greater than the surging limit compression ratio, a valve 16 on the high pressure side of the compressor is opened.

As an initial matter, Iida does not disclose the claimed steps of calculating a surge mass flow rate at a surge line of said compressor at said pressure ratio and comparing said standard mass flow rate to said surge mass flow rate. Iida approaches surge in the compressor as a pressure ratio problem, and accordingly monitors pressure and, if needed, releases pressure at the high pressure side of the compressor.

The invention addresses a problem of compressor surge in the interaction of a turbo-compressor flow and an EGR flow. According to claim 1, the compressor flow is compared to a surge flow rate, and if necessary to avoid surge, the EGR flow is adjusted. This method is different in approach and execution than the method of Iida.

In addition to the lack of disclosure of calculating a surge mass flow rate, as acknowledged by the Examiner, Iida does not disclose the step of reducing an EGR flow if said standard mass flow rate is lower than said surge mass flow rate.

For this step, the Action cites the Itoyama application. However, Itoyama is concerned with air/fuel ratio in an engine, not surge. Paragraph 46, lines 11-21, is alleged to disclose adjusting EGR if a standard mass flow rate through a compressor is lower than a surge mass flow rate. This section, to the contrary, says nothing about calculating a standard mass flow rate or monitoring or adjusting EGR in response to compressor surge. Paragraph 46, in total, is reproduced here in total:

[0046] On the other hand, fuel supplied from a supply pump 6 under a high pressure is reserved under the high pressure via a common rail 7 and is injected toward a fuel combustion chamber from a fuel injection valve (a fuel injector) 9 installed within a combustion chamber of each engine cylinder of an engine 8. The injected fuel is, then, ignited and burned in the combustion chamber. In addition, an EGR (Exhaust Gas Recirculation) passage 12 in which an EGR valve (also called, EGR control valve) 11 is interposed is connected between an exhaust manifold 10 and a collector portion 5A of intake manifold 5. An electronically controlled throttle valve 13 (an intake throttle valve whose opening degree is driven to be opened or closed by an associated actuator such as an electric motor) is interposed at an upstream side of intake-air compressor 1A of intake-air passage 3. Such an EGR control as controlling an opening degree of EGR valve 11 is executed at the same time as throttling intake throttle valve 13 in order to improve an emission of exhaust gas and to countermeasure noises, mainly, during an engine idling and during a low engine load.

As clearly stated, to the contrary, that Itoyama discloses an apparatus and method for controlling intake air and EGR for the purpose of controlling the emission of exhaust gas and to countermeasure noise at engine idle. The rejection appears to be the result of an interpretation not supported by the cited text. If the Examiner will continue to assert some interpretation of this text beyond what is written, applicants request that the actual language allegedly supporting the Examiner's position be cited and the exact reasons supporting the interpretation be explained.

In view of the foregoing, it is respectfully submitted that claim 1 is allowable over the cited art. Claims 2 and 3 depend from claim 1 and are allowable at least as depending from an allowable base claim.

Claim 2 was rejected as unpatentable over Iida in view of Itoyama and in further view of US patent No. 6,220,086 to Andrew et al. Andrew discloses a method for ascertaining surge pressure ratio in compressors and includes a surge margin in a compressor map.

The deficiencies of the Iida and Itoyama combination are explained above. The Andrew patent does not overcome these deficiencies and claim 2 is submitted to be allowable.

Claim 3 was rejected as unpatentable over Iida in view of Itoyama and in further view of US Patent No. 5,560,208 to Halimi et al. The Halimi patent discloses a motor assisted variable geometry turbocharger.

The deficiencies of the Iida and Itoyama combination are explained above. The Halimi patent does not overcome these deficiencies and claim 3 is submitted to be allowable.

Claim 4 was rejected as unpatentable over the Iida abstract in view of the Itoyama publication and in further view of the Halimi patent.

Claim 4, as amended, recites a method similar to claim 1, with the addition of the step of reducing the pressure ratio of the compressor by opening a vane of the compressor. Claim 4 is allowable for the same reasons as claim 1 is allowable, which reasons are explained above.

Claim 5 is allowable at least as depending from an allowable base claim.

In view of the foregoing amendments and remarks, it is submitted that the application is in condition for allowance. Favorable action is requested.

The Examiner is invited to telephone the undersigned if there are any questions about this response or to resolve any outstanding issues.

Respectfully submitted,



Martin Farrell
Registration No. 35,506

Volvo Corporate Patents
7825 National Service Road
Mail Stop AP1-3/41
Greensboro, North Carolina 27409
336.393.2270